

Running Head: CIKR and Commercial Marijuana

Discerning the CIKR Classification of Commercial Marijuana Production Facilities for the

Lefthand Fire Protection District

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Certification Statement

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

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Abstract

The problem was that the Lefthand FPD did not know whether or where to include commercial marijuana production facilities on a CIKR vulnerabilities/values chart. In researching this issue some clarity was brought to the question, but not from a community need perspective. Instead, inclusion on a CIKR chart/map would be more for the safety responders from initial attack through recovery.

The purpose of this applied research project was to determine if and how commercial marijuana production facilities should be included in a CIKR vulnerability chart. The descriptive research model was used to study a number of questions including: How should Lefthand FPD classify commercial marijuana production operations on a CIKR vulnerability chart; Does marijuana have a classified use as a pharmaceutical drug; What Colorado State and Boulder County regulatory measures regarding commercial marijuana production are pertinent to the Lefthand FPD; and Where does indoor commercial marijuana production fit in the 2012 International Fire Code.

To answer these questions, the results of the descriptive research method were utilized, as well as a site visit and inspection of a licensed commercial marijuana production facility within the district. The results found that local code enforcement activity as directed by the 2012 IFC would provide the best result for gaining and maintaining situational awareness in regards to location and type of operation, as well as identifying and working with the operators to reduce risk and hazards within the facilities to enhance the safety of the firefighters and the employees of the business. It was also found that marijuana is not listed on either the United States Pharmacopeia or as a pharmaceutical drug by the United States General Accounting Office and

is listed as a Schedule 1 Controlled Substance, which is a non-pharmaceutical addictive substance, by the Drug Enforcement Agency of the Department of Justice. Likewise it was discovered that the State of Colorado and Boulder County do have regulations in place for medical marijuana, and are utilizing those regulations to develop regulations pertaining to the use and cultivation of adult-use marijuana per the recommendations of the Task Force on Amendment 64. Searches on the World Wide Web yielded a great deal of non-scientific information regarding the cultivation and use of marijuana, but relatively little information about the regulation issues associated with the commercial production of marijuana (THC). Due to that finding, more study was recommended.

Recommendations have been made to Lefthand FPD including a recommendation to continue to pursue the study of this topic as it is a new issue for the Lefthand FPD. Also included in the recommendations was adherence to the 2012 IFC, listing marijuana production facilities as a contents risk on a CIKR chart/map, familiarization with State and County regulations regarding marijuana production facilities, enhanced training to help Lefthand FPD personnel recognize hazards and risks associated with these facilities, and adoption of a defensive operations policy for fires in these facilities.

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Introduction

The fire service is charged with the mission of ensuring that the communities we serve are prepared for emergencies and disasters. One of the tools we have at our disposal is the Critical Infrastructure/Key Resources (CIKR) vulnerability chart formulated by FEMA. Each agency, County or area Office of Emergency Management is encouraged by FEMA to develop CIKR charts to better ascertain the location, type, contents, and potential threat to vital community resources during a time of disaster, either natural or man-made. In creating vulnerability maps for our districts, we can respond more effectively to disaster, better understanding the purpose, contents, occupancies, and associated hazards within the various structures located within a district. It also will allow for incoming aid resources to have a better understanding of the location and needs for protecting and restoring critical infrastructure and key resources for a community.

One of the primary missions of the evolving fire service should include the continuous identification and mitigation of hazards within each district to ensure the safety and uninterrupted flow of daily activities. During a disaster, daily activities of the citizens are disrupted. The sooner that the fire and emergency services, working with other response agencies can stabilize the emergency, the sooner we can start returning the community to a state and sense of normalcy. In the process of evolving technology and community standards, the fire service is challenged with developing measures to protect a variety of unfamiliar enterprises. Through risk analysis and mapping using tools such as CIKR charts, we as a service can better protect the lives and property of our citizens.

As set forth in the white paper *America Burning*, fire agencies and certain selected governmental agencies were identified as responsible for researching and creating solutions where possible for what the commission referred to as the fire problem (Neville, 1973). The National Commission on Fire Prevention and Control reviewed and revalidated this thesis in *America Burning Revisited* in 1987 when they concluded that “the reader should not find major new or dramatic problems; you will discover that there are significant changes in the fire environment today, major changes in fire department responsibilities, increased concern about firefighter health and safety.” (United States Fire Administration, 1987). In preparing *America Burning revisited* the committee assembled 7 task forces to examine and summarize where the fire service is and where we need to be going. Task Force 7 was charged with “Preparing for the 21st Century”. Task Force 7 returned the observation that “The role and responsibilities of the fire service are being redefined as the environment and the demands of local government change.” (United States Fire Administration, 1987).

The State of Colorado is in a unique situation with the passage of Amendment 64 in 2012. Amendment 64 allows for the commercial cultivation and production of marijuana and retail sale of marijuana to adults. The Lefthand FPD has a large scale commercial marijuana production facility with an associated retail outlet within the district. The Lefthand FPD must prepare itself by identifying the risks and needs associated with such an operation, and how disruption of service would affect the community life on a daily basis. Utilization of a CIKR value chart is a simple, effective method for accomplishing this task.

The problem is that the Lefthand FPD does not know whether or where to include commercial marijuana production facilities in the CIKR vulnerability chart for the Lefthand FPD. The officers and response personnel of the district do not have any method for analysis and

addressing the risks and needs of particular occupancies during disasters. A CIKR chart can assist in determining strategies for the various identifiable emergency scenarios that exist within the districts.

The purpose of this applied research project is to determine if and how commercial marijuana production facilities should be included in a CIKR vulnerability chart. This applied research project will use the descriptive method as the instrument to determine the answers to the following questions: Question #1: How should Lefthand FPD classify commercial marijuana production operations on a CIKR vulnerability chart? Question #2: Does marijuana have a classified use as a pharmaceutical drug? Question #3: What Colorado State and Boulder County regulatory measures regarding commercial marijuana production are pertinent to the Lefthand FPD? Question #4: Where does indoor commercial marijuana production fit in the International Fire Code?

Background and Significance

The Lefthand FPD is centrally located in Boulder County, and is responsible for fire, wildland fire, advanced life support (ALS) EMS, mountain rescue, ice rescue, water rescue, and Hazardous Materials response for more than 60 square miles of unincorporated Boulder County from 4 stations. The district extends from the plains at 5400' above sea level rising through mountainous terrain to 9200' above sea level. There are 5 primary subdivisions in the district occupied by more than 2000 permanent residents. Large tracts of the USDA Arapahoe-Roosevelt National Forest are located within the district boundary, attracting thousands of recreational visitors annually. The Forest provides law and fire protection, and Lefthand FPD provides fire, rescue, EMS and wildland fire response in the forest through mutual aid agreements. The fire protection district provides response to the following occupancy models: light industrial, residential, wilderness.

The Lefthand FPD is a primarily volunteer combination fire department with 2 paid Chief Officers, 3 paid mitigation specialists who are firefighter/EMT qualified and 35 volunteer members who are trained structural, wildland, rescue and EMT responders. All members are Colorado State certified at their level of training, and they must remain current in their training to maintain their eligibility for their state sponsored pension. Coverage is provided from 4 stations, 1 staffed during daylight hours and 3 typically unstaffed, with volunteers responding to the nearest station for the appropriate apparatus and the Chiefs responding either from Station 1 or from home directly in department provided apparatus.

The district was formed from the Boulder County Civil Defense District #5. It provides protection for the areas north and west of the City of Boulder. Originally Civil Defense District

#5 was based in Jamestown. In 1963 the municipality of Jamestown decided that they were no longer capable of providing fire protection services for the entirety of Civil Defense District #5. At that time there were a series of developments being constructed in the unincorporated areas of Boulder County within the boundary of Civil Defense District #5. These areas came together to work on providing fire protection to the Civil Defense District #5 area outside of Jamestown, and in 1984 formed the Lefthand Fire Protection District.

The topography of the district encompasses the plains area at the base of the mountains and follows 2 major canyon roads 15 and 17 miles respectively to the Peak to Peak highway which forms the western boundary of the district. The eastern boundary is formed effectively by the North Foothills highway, and the district extends two miles east of that highway into two minor subdivisions. There is a third canyon road which departs Lefthand Canyon Dr. at the 5 mile mark and winds an additional 10 miles to the Peak to Peak highway as well, which is access for two of the major subdivisions of the district. The canyon roads follow stream valleys through the mountains. There are three streams passing through the district, with confluences at canyon road intersections, creating two rivers that flow over the plains to the east. Additionally, there are a number of small lakes and reservoirs throughout the district. (Greenwood, 2011)

The Lefthand FPD is responsible for response to a light industrial complex at the base of the foothills on highway 36 north of Boulder. There are a number of warehousing and other similar structures that were once the Beechcraft Aviation facility. The land and occupancies were acquired by other private interests and leased out for commercial space. There have been a number of commercial interests housed in the complex, most recently, McGuckin's Hardware storage warehouse, and commercial marijuana production facilities.

The greenhouses are a direct result of the passage of Colorado Amendment 64, which allows for the cultivation and use of recreational marijuana. While Boulder County and the State of Colorado are tackling the regulatory issues that surround the production, manufacture, sales and use of recreational marijuana, Lefthand FPD is faced with the problem of responding to emergencies and disasters both natural and man-made at the facility.

Commercial cultivation of agricultural products in greenhouses is not a new production model. What is unique to the cultivation and production of marijuana is the type and level of security measures that are required to be implemented by the State of Colorado and the addition requirements within the Boulder County Medical Marijuana Licensing Regulations. Currently there are no rules in place yet in Boulder County and the State of Colorado regarding the production, manufacture, sales and use of recreational marijuana because they are being developed by the State and County Legislatures. The only rules currently available in both Boulder County and the State of Colorado for business owners who wish to develop a commercial grow operation for the production of recreational marijuana are found in the rules for the production of medical marijuana.

One of the methods of discovering the presence and operation of such facilities is through the licensing process provided by Boulder County. The license application requires the applicant to have permission from the property owner to engage in the activity of growing (medical) marijuana, and to allow the Boulder County Building Official or his or her designee to enter and inspect the premises (Boulder County, 2013). Through our inspection process we can identify and locate facilities that are intended to be used for the commercial production of marijuana for recreational use.

Along with the minimum security requirements posed upon these facilities by the State of Colorado and Boulder County, the producer in Lefthand FPD has opted to contract armed security guards in addition to the standard security requirements. These guards are heavily armed with automatic weapons. Response to a simple emergency at the facility will require responders to ensure first that there is no shooting occurring, and that the emergency is not the result of a shooting. If there is shooting involved, Lefthand FPD responders will stage per our operational guidelines and await clearance from Deputies who respond.

These types of facilities pose a new series of risks for first responders, requiring that current risk assessments in place are reviewed. Risk assessment is an ongoing process to ensure that when first responders are faced with a call to an occupancy, they are well prepared with the knowledge of the situation they are likely to encounter. It is a thorough look at our work environment that helps us identify those situations that are most likely to cause harm to our responders (Canadian Centre for Occupational Health and Safety, 2006).

The Lefthand FPD needs to identify whether the commercial production of marijuana has an impact on pharmaceuticals as determined by the United States Pharmacopeia, what rules apply to such facilities as determined by the International Fire Code 2012 as adopted by the Lefthand FPD, what measures are in place from the State of Colorado and Boulder County, and where the production facility would fit in a CIKR value assessment chart.

This problem can be correlated to the United States Fire Administration National Fire Academy Strategic Framework Goal 1: “Reduce risk at the local level through prevention and mitigation”; Goal 2: “Improve local planning and preparedness”; and Goal 3: “Improve the fire services’ capability for response to and recovery from all hazards.” (U.S. Department of

Homeland Security, 2011). Likewise, in researching where commercial marijuana grow operations this thesis relates to the United States Fire Administration's operational objective to improve local planning and preparedness (U.S. Department of Homeland Security, 2010).

Literature Review

The use of marijuana for legal recreational purposes is brand new for the State of Colorado, and represents a major shift in social, cultural, and economic values for the state. With the passage of Amendment 64, the State of Colorado and the local regulatory agencies including Building, Revenue, Transportation, and Emergency Services are challenged with promulgating rules for the cultivation and commercial production of marijuana for recreational use. Along with this change is coupled the need to figure out how to keep the producers of marijuana safe in their working environment.

Commercial grow operations were certainly not on the forefront of thinking in 1972 when President Nixon commissioned a committee who studied a wide variety of the contributing factors to the fire problem facing America and the fire services, which would later expand to the emergency services. The appointees to the commission undertook the task of reviewing all aspects of the fire service both current and projected future in an effort to create a guideline for creating direction for the improvement in the provision of fire and emergency service. While additional services such as EMS were addressed, the document could not capture the full scope of what the fire service has come to be today, and there are service delivery issues yet to be discovered and identified.

The white paper *America Burning* and was published in 1973. In terms of creating a safer environment for industrial/agricultural workers and the identification and reduction of community risk and the role of disaster recovery, there were vague references to code enforcement through focus on fire loss, both property and life, and on manufacturing process of building construction, finishes and furnishings. The study also identified specific agencies within

the government which could be utilized to assist the fire service in researching and resolving fire related issues. To assume that researching the potentialities of commercial marijuana production for medical or recreational purposes and the implications for disaster recovery mapping was considered would be inconceivable. One of the early recommendations in *America Burning* was to allow for local control of code enforcement based on the notion that local authorities were more aware of local needs and concerns. Simultaneously, the paper called for unified codes that would function as an umbrella under which local enforcement could function, allowing for a more coordinated approach to construction and hazard reduction (Neville, 1973). There was early recognition that there was a need to address community needs beyond the fire problem, a need to manage risk and recovery.

In 1987, the United States Fire Administration in conjunction with the Federal Emergency Management Association hosted a 3 day workshop in Tyson's Corner, VA. The focus of this workshop was to review and follow up on *America Burning*, to ensure that the message was still appropriate, or if not, how would it need to be changed to fit the progress made by the fire service from the time of the publication of *America Burning* until the time of the conference. The title of the workshop and subsequent recommendations was appropriately enough, *America Burning Revisited*. During the course of three days, seven panels reviewed the 90 recommendations made in *America Burning*, including one panel which was tasked with looking ahead to the 21st century. One of the observations delivered by Task Force 7 which was the panel charged with "Preparing for the 21st Century" was that traditional fire department activities are being replaced or supplemented with new challenges (United States Fire Administration, 1987). This suggested a shift away in thinking about the fire service as

designated only for fire and not for other community risks such as code enforcement and disaster recovery planning.

Currently, fire and emergency services are tasked with responding to calls for public assistance, code enforcement responsibilities, disaster planning, and disaster recovery efforts for a diverse array of occupancies from single family dwellings through infrastructure and industrial/manufacturing facilities, including public education events and complex multi-hazard operations involving multiple jurisdictions and agencies. Natural disasters, including wildland fire, are very good examples of a multi-hazard event where the fire is threatening access/egress, homes, civilians and the hazards commonly associated with fire: smoke, chemical by-products of combustion, explosion, electrical hazards, frightened public, animals and a host of hazards otherwise unforeseen, and the ensuing recovery from the post-fire event. In fact, the National Wildland Coordination Group has been repeatedly recognized as a leader in the successful application of Incident Command Systems during incidents to the point where they have been called upon to manage incidents and recovery operations other than wildfire such as the World Trade Center attack aftermath in 2001 or the space shuttle recovery mission in February 2003, and Hurricane Sandy in 2012. These are all examples of multi-hazard events that were neither predicted nor prepared for, and required massive coordination of effort from all responding agencies to identify and return the infrastructure to an operational level that could sustain the communities which it was built for.

While the fire and emergency services are tasked with responding to emergencies and assisting with recovery efforts for incidents within and beyond their communities, there is little local information available regarding where commercial marijuana production for either medical or recreational use would be categorized within a FEMA CIKR values chart. The State of

Colorado is still engaged in the rule-making process for the engagement of business whose purpose is the commercial production of marijuana for recreational use (McCann, 2013). The current model the task force is borrowing from is the Medical Marijuana Licensing codes created on July 1st, 2010 for the production and sales of marijuana intended for medical use (State of Colorado, 2010).

The Task Force was challenged with presenting a report identifying the legal, policy, and procedural issues needing to be resolved as a result of the passage of Amendment 64, and to offer suggestions and proposals for the legislative, regulatory, and executive actions needed for the effective and efficient implementation of the amendment. The goal was to have necessary regulations prepared for adoption by the Colorado Department of Revenue by July 1st, 2013, and provide the ability to begin accepting and processing license applications by October 1st, 2013 (McCann, 2013).

The Task Force was able to use existing Medical Marijuana Enforcement rules to craft recommendations for the implementation of Amendment 64. There are numerous references to existing marijuana rules regarding medical marijuana, and the recommendations provided by the Task Force include maintaining the 30% rule for sales to other marijuana vendors, maintaining the current vertical integration model used for medical marijuana production and sales, granting the state authority to issue licenses conditional on local government approval, and allowing the local entity to either defer to state-adopted standards for adult-use marijuana, adopt its own standards in addition to the state required standard, or the ability to ban adult-use marijuana establishments in their jurisdictions, which allows for greater flexibility for local jurisdictions (McCann, 2013).

With the establishment of adult-use marijuana facilities, particularly commercial grow operations, the burden of enforcement falling to local jurisdictions will be an expensive proposition. Plan reviews, inspections, and code enforcement are time-consuming endeavors that can divert the focus of engine companies or administrative personnel. The Task Force recommended that the General Assembly adopt legislation defining operating fees, which are fees charged by a local government for costs including but not limited to inspection, administration and enforcement, the goal being to tie the operating fees with direct administrative costs (McCann, 2013).

Per the *Boulder County Medical Marijuana Licensing Regulations*: “The Authority (Boulder County Medical Marijuana Licensing Authority) shall circulate the application to the Land Use Department, the Transportation Department, the Sheriff’s Office, Public Health, the Boulder County Treasurer, and the applicable fire district.” (Boulder County, 2013). These are intensive reviews affecting many agencies to ensure the public safety, safety of the employees, revenue tracking, access to the business, and placement within the community.

When commercial marijuana grow operations occur in light industrial areas they can be easily identified and regulated. One of the challenges that all of the aforementioned agencies face is the undocumented grow operation. Typically these are housed in single family occupancies and are disguised as a common household. The facades that are constructed are done in a manner that implies that the occupancy is what it appears to be, a single family residence. However, security measures like reinforced or barred doors, boxed windows for privacy, inappropriately installed electrical wiring for grow lamps and air circulation fans can disguise the seriousness of the fire contained within and make access or egress very difficult, effectively becoming a fortress that can trap fire crews operating within (Goldfeder, 2013).

When faced with conditions similar to what could be expected in an increased security facility like commercial marijuana grow operations, firefighters must use risk assessment and analysis tools to determine the most appropriate course of action. Given the nature of the assignments firefighters face they must be familiar with tools and tactics that help them to identify and mitigate risk. It would be inappropriate to suggest that any responders can know every risk they face, and part of what makes assessing risk difficult is the unknown. The goal is to take the known and utilize it for an advantage. This is commonly referred to as situational awareness or SA. SA is a widely used concept in wildland firefighting and in military operations. The *Incident Response Pocket Guide* published by the National Wildfire Coordinating Group lists human factor barriers to situational awareness. Among the identified factors are low experience level with local factors, distraction from primary task, fatigue, stress reactions, and hazardous attitudes (National Wildfire Coordinating Group, 2010). We can increase our SA through a variety of methods including improved communications, training to better familiarize one's self with conditions and situations that may be encountered, preplanning, and developing CIKR value charts and maps for our districts. By developing these materials prior to a disaster, we can improve the SA of not only the initial responding agency but also the mutual aid and resource agencies tasked with aiding in any recovery. These CIKR maps help to locate occupancies based on contents, congregation, and purpose (utility), and give a brief synopsis of the occupancy and associated hazards. By knowing the hazards prior to making any sort of entry, the responding crews can initiate risk reduction practices.

Risk assessment is, in practical terms, a thorough look at the work environment in order to identify those things, situations, processes, and practices that can cause harm to people or property (Canadian Centre for Occupational Health and Safety, 2006). By definition it is an

ongoing practice. It is important because it allows us to create awareness of hazards and risks, identify who may be at risk, determine if existing control measures are adequate to reduce the risk, prevent injury or illness at the planning stage, and prioritize hazards and control measures (Canadian Centre for Occupational Health and Safety, 2006). Risk can be prioritized based on the mission at hand and the environment encountered. “Priority is usually established by taking into account the employee exposure and the potential for accident, injury or illness. By assigning a priority to the hazards, you are creating a ranking or an action list.” (Canadian Centre for Occupational Health and Safety, 2006) CIKR value charting is a prioritized list, ranking values for their benefit or risk to a community.

Looking outward to agencies beyond fire/EMS, there are some examples of agencies that provide community protection and disaster services that utilize risk reduction practices in the execution of their missions. Fire and emergency services are not the only agencies charged with protecting a community during and recovering from a disaster. There are a number of government and private sector agencies that provide disaster relief service and can be utilized during disasters.

FEMA publishes a security risk management series of articles which are intended to provide guidance for mitigating multi-hazard events. The objective is the reduction of physical damage to both structural and nonstructural components of buildings and related infrastructure, and to reduce resulting casualties from impact by terrorist activity and natural disaster (FEMA, 2012). These resources can be used to develop models for defining community values for inclusion in CIKR charts and maps.

The Department of Defense has long recognized that risk management allows for greater SA and more successful operations in high risk environments. While the risk management practices that are typically referred to in the *Commander and Staff Risk Management Booklet* are intended for the military community, there is assessment tools contained therein which are available and applicable to the external environment or community. They identify 5 steps in risk management: Identify Hazards; Assess Hazards; Develop Controls and Make Risk Decisions; Implement Controls; Supervise and Evaluate (U.S. Army Safety Center, 1999). These five steps can be incorporated in decision making regarding CIKR mapping. Once that is ascertained the CIKR map can be developed and can be applied as a decision making tool.

In the *Army Study Guide for Risk Management* PowerPoint students are taught that implementation of risk management principles are the responsibility of leaders and soldiers at all levels. They are responsible and accountable for managing risk by ensuring that the hazards and risks are continuously identified in the planning, preparation, and execution of operations, and that they are controlled during the preparation and execution phases of operations (U.S. Army, 2010). Further, the responsibility of maintaining safety falls back to the soldiers on the line, and they are to do so in accordance with the directives of their officers.

“Real risk management involves accepting the fact that bad things happen, being as aware of those bad things as possible, and doing our best to make sure the bad things don’t impact our citizens’ ability to accomplish their mission.” (Ward & Quaid, 2007). Through the process of pre-identifying hazards, risks and community needs, we can decrease the impact of disaster on a community. The development of the CIKR values chart and map is a valuable tool in developing our SA for the potential impacts of a disaster and prioritize recovery efforts.

Risk assessment provides information on potential ecological or health risks and impacts on a community. Risk management is the action taken based on consideration of the original and other information such as: Scientific factors; economic factors, laws and legal decisions, social factors, technological factors, political factors and public values, in other words the SA developed both prior to and during the response (Environmental Protection Agency, 2012). “The factors that are quantifiable are the scientific, technological, and economic factors; the more interpretive or abstract factors are the legal, social, political, and public values (public acceptance of a particular practice).” (O'Brien, 2012).

The EPA uses a slightly different risk assessment process for hazards to human health. Assessing human health risk is the process designed to estimate the probability and nature of negative health effects to humans who may be exposed to chemicals in contaminated environmental media (Environmental Protection Agency, 2012). The Planning phase does not change; however from there the EPA progresses into Hazard Identification. Hazard Identification studies the potential of a stressor to cause harm to humans and/or ecological systems, and if the potential exists, under what circumstances will harm occur. Dose-Response Assessment examines the numerical (scientific) relationship between exposure and its effects based on dose. Exposure Assessment reveals what is known about the timing, frequency and amount of contact with a known stressor, and Risk Characterization examines all of the data and whether or not it supports the conclusions about the nature and extent of the risk from a given exposure to environmental stressors (Environmental Protection Agency, 2012).

These tools can be used in the development of CIKR materials to identify the need and method of protecting the public from the contents of a commercial occupancy. It helps in the identification and classification of an occupancy in a CIKR chart and on the map.

Another useful resource in identifying and mitigating hazards and risks are the International Fire Code and International Building Codes (IFC and IBC respectively). As stated above, the regulation of commercial marijuana grow operations per Amendment 64 will fall to the local level. Boulder County Colorado has adopted the 2012 IFC and IBC. Lefthand FPD has also adopted the 2012 IFC. There are no references in the 2012 IFC regarding the commercial cultivation of marijuana, or any other indoor produce cultivation. The IBC classifies greenhouse occupancies as Class U (Utility) occupancies (International Code Council, 2011). However, warehouse spaces repurposed for commercial marijuana production operations are not greenhouses in the common sense of a frame and glass enclosure. The IBC classifies production occupancies that manufacture hemp materials as class F1 (factory) moderate-hazard occupancies (International Code Council, 2011). Likewise the IBC identifies agricultural buildings as “a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products. This structure shall not be a place of human habitation or a place of employment where agricultural products are processed, treated, or packaged, nor shall it be a place used by the public” (International Code Council, 2011). In other words, they are describing barns.

The IFC has a number of applicable sections to the occupancy in Lefthand FPD’s area used as a commercial marijuana production facility. Section 102.3 provides that any change of use for an occupancy is not allowed unless that structure is made to conform with the IBC and IFC requirements for the new occupancy type (International Code Council, 2011). Both the IFC and the Colorado Amendment 64 Task Force allow for local inspection authority, authorizing the local fire code official to enter and examine any building, structure, marine vessel, vehicle or premises for the purpose of enforcing this code (International Code Council, 2011). Provisions

exist in the IFC for fire sprinkler protection systems in facilities larger than 12,000 square feet, for manual alarm stations, for ethylene gas if used for ripening (although CO₂ is typically used for growth stimulant) and for fumigation if fumigation techniques are being used (International Code Council, 2011). Through inspection we can identify the hazards, risks and community need for the facility at the local level, and we can ensure compliance with both the fire code and Colorado Amendment 64. We can also ascertain if and where such a facility would be placed in a CIKR chart and map.

Another issue associated with the commercial production of marijuana is if it is in fact considered a drug in the United States Pharmacopeia (USP). Marijuana was removed from the USP in 1937 (Ryan, 2009). Marijuana is listed as a Schedule 1 Controlled Substance by the Drug Enforcement Administration. Substances listed in this schedule have no currently accepted medical use in the United States, have a lack of accepted safety for use under medical supervision, and a high potential for abuse. Some of the substances listed in Schedule 1 are: heroin, lysergic acid diethylamide (LSD), marijuana (cannabis), peyote, methaqualone, and 3,4 methylenedioxymethamphetamine ("Ecstasy") (Department of Justice, 2013). While there are not medical uses for marijuana, there are 18 states that have adopted medical marijuana legislation allowing for use of marijuana for certain medical conditions such as glaucoma, high blood pressure, analgesic for chronic pain, appetite enhancement for cancer patients, and for HIV patients.

As a result of the prohibition of marijuana, the study of the drug and its effects as well as uses for medical conditions has been curtailed. In fact, the U.S. Government Accountability Office stated in 2002 that it does not recognize any medical use for marijuana and further stated that individuals using marijuana for medical purposes would be subject to

penalties under federal law (Ryan, 2009). This presents a conundrum, the federal government does not recognize marijuana as having medical use, and yet 18 states and numerous physicians have prescribed marijuana and marijuana derivatives for medical purposes.

In summary, the commercial production of marijuana needs more study. As a CIKR value, it is negligible. It does not fit the content/occupancy/purpose model used in CIKR charting very well. It could be placed under the content category in terms of the risks that could be involved in disaster restoration due to the elevated security measures and growing chemicals.

The mandate for risk reduction is available for the fire service through the white papers *America Burning*, and *America Burning Revisited*, and through the strategic framework goals identified by the NFA. Those goals include reducing risk at the local level through prevention and mitigation, improving local planning and preparedness, and improving the fire and emergency services, capability for response to and recovery from all hazards. By identifying the risks of the commercial production of marijuana we can better mitigate them, and determine where and if they meet CIKR value standards.

Marijuana as a pharmaceutical is a dilemma. While it is currently allowed for medical purposes in 18 states, it is not listed in the USP and the GAO does not recognize it for medical use (Procon.org, 2013). All of the identified uses are for palliative care rather than cure.

In terms of regulation, the State of Colorado and Boulder County are in the process of crafting the legislation and rules that will determine regulation, licensing, distribution, cultivation, and use of marijuana for adult-users. The state is allowing for local regulation, however, the state will provide regulation and enforcement for those communities who cannot

provide for themselves locally. These new regulations are being crafted primarily from the regulations that currently govern medical marijuana use.

Both the IFC and the IBC can be useful regarding reducing the hazards found at the occupancy. Inspections for IFC compliance will be the best method to access and assess risks in these facilities, and to familiarize crews so that they do not face unknown dangers when responding to calls at commercial marijuana production facilities. While there is not a direct reference to marijuana production in either code, in many cases the production facility is an occupancy type that has been repurposed for the production of marijuana, and that new occupancy type best fits the F1 Factory-Industrial Moderate Hazard Occupancy model.

Procedures

This advanced research project was conceived by the researcher during a discussion at a structure fire in a single family dwelling that had been converted into a marijuana grow house. Many of the security measures mentioned in the Goldfeder article were found in this domicile: uncertified changes in the electrical wiring to provide power for the grow lamps and the environmental control fans, heavy duty entry doors with additional security bars, hidden spaces, and an overloaded interior space that made movement difficult. Drawing upon exercises and information delivered in the Executive Analysis of Fire Service Operations in Emergency Management, coupled with the advent of the passage of Colorado Amendment 64 legalizing marijuana for adult use, and the discovery of licensed commercial marijuana production centers in the Lefthand FPD, the researcher chose to analyze four questions pertinent to the commercial production of marijuana in the Lefthand FPD.

Initial research was conducted through a site visit to a licensed commercial marijuana production facility located within the Lefthand FPD. The entrepreneurs were eager to demonstrate their security measures, grow rooms and production rooms, as well as the techniques and specialized equipment used in the growing and production of marijuana products.

Code enforcement materials were reviewed, and during the course of research and in reviewing the 2012 IFC, the Board of Directors of the Lefthand FPD were convinced to draft and adopt a resolution calling for compliance with the 2012 IFC.

Additional research was conducted on-line using the internet search engines Bing and Google, looking beyond the fire service for information regarding the history of marijuana as well as its use as a pharmaceutical. This yielded a great deal of unsubstantiated, anecdotal

information. Care was taken to identify reliable sources such as the Livestrong foundation and Procon.org which is an independent, non-partisan, 501(c)(3) charity (Procon.org, 2013).

Research was done on regulatory legislation including Colorado Amendment 64, the *Task Force Report on Amendment 64*, and the Boulder County Medical Marijuana licensing rules. Currently, the only regulations available are concerning medical marijuana. The medical marijuana legislation in Colorado has proved to be a “successful” model, and the recommendations from the Task Force reflect the fact that adult-use marijuana should use the medical marijuana rules as a model for the development of adult-use marijuana rules.

Due to the relative infancy of licensed commercial production of marijuana in Boulder County, and the Lefthand FPD, there are many yet to be answered questions. There is also a lack of reliable source information. The internet is rife with information regarding the cultivation and use of marijuana; however this information is produced primarily by end users, is non-scientific, or is not from a regulating authority.

In looking at the medicinal qualities of marijuana, the three main stumbling blocks which call to question the efficacy of marijuana as a prescription medication are a lack of credible scientific research resulting from the prohibition of marijuana, the fact that it is not recognized as a drug in the USP, and the fact that the U.S. GAO does not recognize it as a drug with medical value. Based on anecdotal evidence, marijuana is at best a palliative drug which provides comfort for people more than a cure.

The purpose of the literary review was to determine the extent of the information available on the commercial production of marijuana products, the risks and hazards associated with the production of said commodity, the regulations regarding the licensing, distribution,

cultivation, and use of marijuana for adult-users, and the code enforcement issues that would be associated with commercial marijuana production facilities, and to ensure that the scope of the research was sufficient for this project to answer the following questions: Question #1: How should Lefthand FPD classify commercial marijuana grow operations on a CIKR vulnerability chart? Question #2: Does marijuana have a classified use as a pharmaceutical drug? Question #3: What Colorado State and Boulder County regulatory measures regarding commercial marijuana production are pertinent to the fire service and Lefthand FPD? Question #4: Where does indoor commercial marijuana production fit in the International Fire Code?

As a result of the literary review, reviewing the *Task Force Report on Amendment 64* recommendations, reviewing the provisions of the 2012 IFC and 2012 IBC, and looking at the FEMA CIKR process the questions can be answered, but in some cases not completely.

Given that the legislation for regulation has not yet been finalized, answering question #3 can be done only by projection. The regulations governing Medical Marijuana are currently available, and the Task Force recommended following the Medical Marijuana model, we can presume that if the recommendations are accepted and adopted, the regulations for adult-use marijuana should be very similar.

Results

By using the descriptive research model and literary review, it was found that there is not sufficient significant information available yet to answer all of the questions posed. Likewise, there are more questions that arise as we review the available information, and there is a great deal of information available that is neither scholarly nor empirical to demonstrate the evidence of the argument appropriately. This is a topic that is very new and can be returned to as better information and data become available. Some of the secondary questions include: taxes and financing code enforcement operations, what are the risks to firefighters in terms of construction and codes within the 2012 IBC and 2102 IFC, what are the secondary risks to firefighters in terms of the enhanced security measures, some of which are required by code, what are the risks to the public in terms of quality control and hazardous materials releases of growing media, and the associated use risks and issues with vehicle operation while under the influence or in the work environment.

Regarding Question #1, classifying commercial marijuana grow operations on a CIKR map benefits the district from a preplanning perspective, however, these facilities would fall best under the contents category. There is no medical benefit to restoring commercial marijuana production facilities as a priority during a disaster. Categorizing them in the contents category simply gives the firefighters and other responders better SA as to the purpose of the facility, and assist them in making more appropriate response decisions.

Question #2, does marijuana have a classified use as a pharmaceutical drug revealed that neither the USP nor the U.S. GAO recognize medical value associated with marijuana. If there

was a medical value associated with marijuana, it would still remain in the contents category of a CIKR chart, but it may gain higher priority status for disaster recovery.

Question #3, what Colorado State and Boulder County regulatory measures regarding commercial marijuana production are pertinent to the fire service and Lefthand FPD can only be addressed through projection of the Medical Marijuana regulations. The Task Force identified the current Medical Marijuana regulations as the most appropriate set of rules to model for the regulations being developed for adult-use marijuana. By understanding those, we can project what the regulations for the commercial production of adult-use marijuana would be like. The vertical integration model has been proposed as the recommended model for production and distribution of adult-use marijuana.

Question #4 investigated where does indoor commercial marijuana production fit in the International Fire Code. The short answer is that it fits in the F1 occupancy type, factory-industrial moderate hazard group of the 2012 IFC and the 2012 IBC. As the majority of the grow operations occur in repurposed pre-existing structures, and cannot be affected in greenhouse environments efficiently enough to meet consumer demand, greenhouse production facilities, which fall under occupancy group U (utility) are not used as an industry standard for commercial marijuana production. Commercial marijuana production facilities need a well-controlled environment to stimulate a faster than natural growth cycle to maintain or increase production. Special fertilizers are used and in some cases CO₂ is pumped into grow rooms to expedite growth. Through the use of inspection and code enforcement firefighters can gain access to commercial marijuana production facilities and perform risk assessment while on site to increase their situational awareness in the event of an emergency or disaster at the facility. In doing so,

we loop back into Question #1, how do we classify commercial marijuana production facilities on a CIKR values chart.

Discussion/Implications

Determining whether and where commercial marijuana production operations should be classified in a CIKR vulnerability chart for the Lefthand FPD relates to Question #1: How should Lefthand FPD classify commercial production operations on a CIKR vulnerability chart?

Currently, there is enough information to suggest that it might have a classification in a CIKR chart and map, however, it would be placed in that document more as a result of the risks to the responders versus the community need to reestablish production following a disaster. Given the fact that marijuana does not occupy a position in the United States Pharmacopeia, and the United States General Accounting Office does not consider it to have actual medical use, the need to reestablish production and supply of marijuana (THC) would not be a priority, which relates to Question #2: Does marijuana have a classified use as a pharmaceutical drug?

Instead, the priority would be in keeping first responders and aiding agencies safe from the pitfalls they may face as a result of the extraordinary security measures that are required by marijuana licensing rules and any additional security measures that producers may take to ensure the safety of their product. As pointed out in William Goldfeder's article, the doors were reinforced, windows were boxed and there was uninspected electrical wiring throughout the building (Goldfeder, 2013). Fortunately, the advent of legalizing these operations will reduce the frequency of these fortified set-ups in unexpected situations. With Amendment 64 and the recommendations of the Task Force, the base levels of security will be regulated, and the facilities that house these operations will be inspected. Or that is if the state adopts the recommendations from the Task Force on Amendment 64.

The state has an opportunity to reduce the number of illegal growing operations and the code violations that accompany them through the adoption of the recommendations of the Task Force. Given that the recommendations are modeled on the existing medical marijuana licensing regulations, adoption could be as easy as a pass-through. By accepting this, the lives of the firefighters and emergency responders who strive to deliver service at emergencies in these locations can be made safer. Code enforcement at the local level is recommended by the Task Force, keeping local resources informed and up to date on activities occurring associated with the commercial production of marijuana.

The 2012 IFC is designed for code enforcement at the local level. The template provided by the IFC for creating legislation to adopt the 2012 IFC asks for the jurisdiction to name itself as the code enforcement authority (International Code Council, 2011). Local authorities may enter into agreements with County, State or Federal agencies to assist in inspection and code enforcement, but that should be done in conjunction with the local agency so that the local responders are aware of the construction, contents and hazards associated with occupancies within their districts.

In the case of the commercial marijuana production facility in the Lefthand FPD, the district worked with the County Building Department as part of the permitting process required for licensing under the Boulder County Medical Marijuana Licensing rules. The district is fortunate to have that partnership, and to be aware of the measures and codes required for successful permitting of the operation. There is a high probability that there are more unlicensed or illegal marijuana growing operations within the Lefthand FPD, however, these are only discovered by accident during district activities or when called to the premises for an emergency operation.

One of the advantages that districts have regarding marijuana production is that they require time and a stable environment from seed to maturity, unlike other illegally produced Schedule 1 Controlled Substances, which are non-pharmaceutical addictive substances. Methamphetamine for example can be produced in about 45 minutes when the ingredients are all assembled, and can be cooked on the move. Marijuana needs a controlled environment that needs cultivation and time to be successful as a commercially produced product. The level of sophistication of the growing methods has increased and growers are using better fertilization techniques and growth encouragement techniques such as a CO2 enriched environment and hydroponic media.

Some of the other issues that should continue to be addressed surrounding commercial production of marijuana include reducing the risks to firefighters when responding for emergencies, fires and disasters at production facilities, and relate to Question #3: What Colorado State and Boulder County regulatory measures regarding commercial marijuana production are pertinent to the Lefthand FPD? It also relates to Question #4: where does indoor commercial marijuana production fit in the international fire code? As the level of sophistication increases at the production facilities, the level of response techniques should keep pace. The 2012 IFC already describes the maximum allowable square footage before automatic sprinklers are required in F1 occupancies (International Code Council, 2011). With the application of the 2012 IFC, F1 occupancies that exceed the allowable square footage for exemption from automatic sprinkler installation are required to have functioning, inspected fire sprinkler systems in place. In those cases where occupancies are protected by an automatic sprinkler system, once verification can be made that all of the employees have exited the building, fire operations could easily convert to a defensive mode, which is safer for firefighters.

The 2012 IFC requirements for annual testing of automatic sprinkler systems is an aid in reducing risk to the firefighters in that they require annual entry into the facility (International Code Council, 2011). During the inspection, risks and hazards can be identified, and reported to the facility owner or operator for mitigation. Further, the mitigation of the hazard can be required to be completed on a specific timeline in order to reduce the risk that the fire companies will face responding to an emergency or disaster at that facility. These annual inspections serve to increase the SA of the responding crews and their leaders. As described in the *Incident Response Pocket Guide*, SA is an ongoing process that can be interrupted by human factors such as complacency (National Wildfire Coordinating Group, 2010). Complacency is a result of thinking that all of the necessary knowledge is already possessed and nothing more can be learned.

Another issue that ties into the SA portion is the security measures. By ensuring that responding companies know the level and type of security measures that they will face when operating in that environment, they are better able to make decisions that will secure their safety. While the security can be mandated by the state, there are no limits or ceiling placed on the level or type of security that facilities may employ beyond the minimum standard (Boulder County, 2013) (McCann, 2013). Given that, companies will need to maintain a heightened awareness of personal safety issues that may arise when entering commercial marijuana production facilities.

Another safety issue related to regulation which can be related to Question #2 uses as a pharmaceutical and Question #3 State and County regulatory measures regards the effects on public safety. The emergency services could potentially see a spike in EMS calls if a production lot of marijuana was infected with mold or was grown with an unregulated, unapproved fertilization technique that could pose a hazard to public health. While the county's licensing rules regarding medical marijuana strictly prohibit the introduction of such batch of marijuana

being sold in the commerce stream with such impurities, until the regulations are adopted statewide for adult-use marijuana, there is a risk to public health through the release of these products (Boulder County, 2013).

An issue that is addressed in the regulations for medical marijuana and is included in the discussion regarding adult-use marijuana is the containment and treatment of waste and by products. The waste products from fertilization will need to be controlled so that they do not interfere with public drinking water supplies, and the unusable product due either to contamination or remnants left from the unneeded portions of the plant, will need to be disposed of in such a way that they do not enter the consumption stream.

Also related to question #3, State and County regulation will be the issues of operation of motor vehicles and heavy machinery while under the influence, and how to address marijuana use in the work environment. The recommendation from the Task Force is to treat marijuana use in the workplace and while operating vehicles similarly to the use of alcohol in those situations. The regulatory mechanisms are already in place for these situations currently with regards to both alcohol and medical marijuana, and they are treated similarly.

These questions are only a beginning to the development of safe practices for dealing with the complexities of responding to emergencies related to allowing a new mind altering drug into general circulation with the same availability as alcohol. As the state prepares to create legislation based on the recommendations of the Task Force, the Lefthand FPD must prepare itself for the issues its responders will face as a result of having commercial marijuana production facilities within its boundaries. Likewise, the Lefthand FPD should be working with

its mutual aid agencies to inform them of the risks and hazards identified through annual inspection practices.

To summarize, Question #1: How should Lefthand FPD classify commercial marijuana production operations on a CIKR vulnerability chart? There is no specific evidence that requires inclusion in a CIKR vulnerability chart other than the responsibility of the district to identify the facility and the hazards contained within to protect both first responders and aiding agencies during a disaster and recovery. Given that the production of marijuana is not essential to community health and well-being, recovery efforts for these facilities should not be a priority.

Question #2: Does marijuana have a classified use as a pharmaceutical drug? By both the United States Pharmacopeia and the United States General Accounting Office standards, it does not. While there is a wealth of information existing on the World Wide Web extolling the positive aspects of marijuana and particularly THC, the uses described are for pain relief or palliative care. The drug has not had any documented curative effects, nor is there scientific research that proves that marijuana (THC) should be used as a pharmaceutical. Currently the USP and U.S. GAO regard marijuana as an herbal remedy that is a non-pharmaceutical addictive substance, earning it a place on Schedule 1 Controlled Substances (Department of Justice, 2013).

Question #3: What Colorado State and Boulder County regulatory measures regarding commercial marijuana production are pertinent to the Lefthand FPD? Currently both are relying on the existing medical marijuana regulations to develop their adult-use marijuana regulations. Once the regulations are adopted they will have a two sided effect on fire and emergency services operations: one side will see an influx in licensing requests to register marijuana production facilities, the other side may see an increase in marijuana related emergencies.

Licensure will be a benefit to the fire and emergency services, it will allow for local inspection of production facilities for code compliance per the 2012 IFC and for risk/hazard analysis to increase the department's SA. It will also allow agencies to locate production facilities within their districts so that they may take appropriate response precautions. To accurately estimate the increase in marijuana-related emergency calls will be difficult until we have a statistically significant data set including: period, call type and severity. While the Lefthand FPD has seen an increase in marijuana related calls since the passage of Amendment 20 in 2010 allowing for medical marijuana, there is a statistically small population that holds a prescription for and uses medical marijuana. Once the regulations are in place for adult use marijuana, the Lefthand FPD and the emergency services providers in the affected areas should prepare for an increase in licensed commercial marijuana production facilities, which will bring with it an increase in the number of code inspections.

Question #4: Where does indoor commercial marijuana production fit in the 2012 International Fire Code? It doesn't. There are no references to the cultivation and/or the commercial production of marijuana in the 2012 IFC. However, the facilities that will be utilized in the commercial production of marijuana are listed in the 2012 IFC. By regulating the facilities, it allows the affected districts to perform assessments of the operation that not only include code conformity status but also risk/hazard analysis to ensure the safety of the companies. Both the 2012 IFC and 2012 IBC specify protection and construction measure to safeguard a structure against the effects of fire and disaster, both natural and man-made. While it is impossible to prepare for any eventuality, based on empirical evidence gleaned from inspection post fire and disaster, the codes recommend protection and construction features that will provide the best potential for successful outcome in an emergency.

This is an exciting period due to the unknowns in this fledgling field. There is more study to be done to develop a more accurate view of how well the regulation coupled with code will work to protect public health and well-being and the lives of the firefighters. By putting the facilities on the map, we can ensure safer and more successful operations from first response through disaster recovery.

Recommendations

The following recommendations are made for the Lefthand Fire Protection District based on the original research, analysis, and literature review in this advanced research project:

- Lefthand FPD should adhere to the adopted 2012 IFC.
- Lefthand FPD should list commercial marijuana production facilities as a Contents risk in CIKR value charts developed for the district.
- Lefthand FPD should familiarize and adopt State and County regulations as part of code enforcement for commercial marijuana production facilities.
- Lefthand FPD should train their responders to recognize the hazards and risks associated with working in F1 occupancies, especially those that have been repurposed for the commercial production of marijuana products.
- Lefthand FPD should adopt operational policy that allows for defensive fire operations at F1 moderate hazard occupancies where there are no known immediate interior life threats.
- As the state moves forward with creating the licensing regulations for Amendment 64, the researcher should continue to study this project and the additional questions raised for the benefit of the Lefthand FPD and other fire and emergency services who will be working with commercial marijuana production operations in their districts.

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